

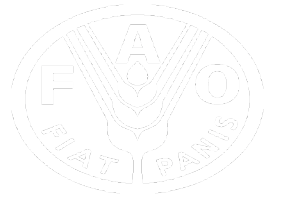


FAO data collection for the SDG 6.4.1 & 6.4.2 indicators

AQUASTAT & GEMI

Food and Agriculture Organization of the United Nations
Land and Water Division

UNSD Regional workshop on Environment Statistics and Climate Change
4-8 November 2019



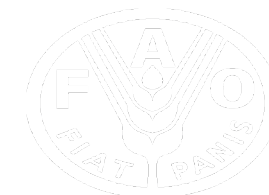
UN-Water GEMI project

- An inter-agency initiative under UN-Water to integrate and expand existing monitoring efforts on several targets of SDG6:
 - Wastewater treatment and water quality (6.3.2),
 - Water use (6.4.1) and scarcity (6.4.2),
 - Integrated water resources management (6.5.1) including transboundary cooperation (6.5.2) and
 - Water-related ecosystems (6.6.1).
- Target 6.4 relies to a large extent directly or indirectly on data, guidelines and methodologies developed and provided by AQUASTAT.
- While WHO and UN-Habitat are the custodian agencies for Target 6.3, also that target relies largely on AQUASTAT data, especially with regards to wastewater production, collection, treatment, use and discharge.

AQUASTAT - Since 1994



- **FAO's global water information system**
- **Answering Article 1 of FAO's constitution to:**
“Collect, analyze, interpret and disseminate information related to nutrition, food and agriculture”. Information on natural resources, especially **LAND and WATER**, is central.
- **Similar to the global LAND resources information system (1980, FAO/UNESCO soil map of the world), a global WATER resources information system was proposed (1992)**
- **Birth of AQUASTAT:**
In 1994, with two complementary programmes:
 1. Main one: Collection of **statistics** on main variables related to water resources and use at country and sub-country level
 2. Supported by: Development of a **GIS-based hydrological capability** to merge information collected from countries to provide a global picture of water resources and withdrawal based on river basins.



The AQUASTAT database



Food and Agriculture
Organization of the
United Nations

AQUASTAT

Submit

Help

English

SELECT VARIABLES (4)

- All Variables
- Geography and population
 - Land use
 - Population
- Economy, development and food security
- Water resources
 - Precipitation
 - Internal renewable water resources
 - External renewable water resources
 - Total renewable water resources
 - Exploitable water resources and dam capacity
- Water use
 - Water withdrawal by sector
 - Agricultural water withdrawal ⓘ
 - Industrial water withdrawal ⓘ
 - Municipal water withdrawal ⓘ
 - Total water withdrawal ⓘ
 - Irrigation water withdrawal ⓘ

Deselect All

SELECT COUNTRIES (1)

- All Countries
- Afghanistan
- Albania
- Algeria
- Andorra
- Angola
- Antigua and Barbuda
- Argentina
- Armenia
- Australia
- Austria
- Azerbaijan
- Bahamas
- Bahrain
- Bangladesh
- Barbados
- Belarus
- Belgium

Deselect All

Search by Region >

SELECT PERIOD

1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2015
1958-1962	1963-1967	1968-1972	1973-1977	1978-1982	1983-1987	1988-1992	1993-1997	1998-2002	2003-2007	2008-2012	2013-2017

Latest values only Value Years

METADATA OPTIONS

Category

- None --
- All --
- Reference Area
- Reference period

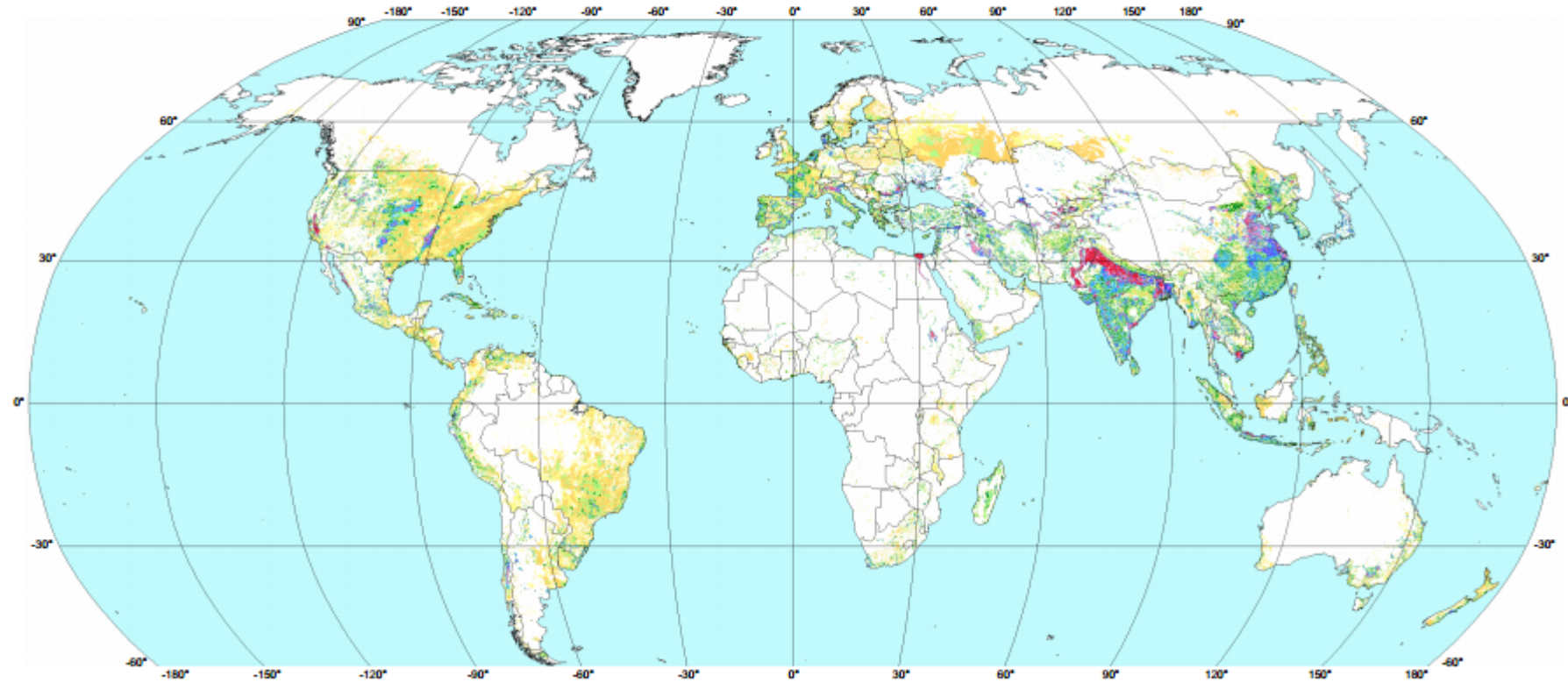
OPTIONS

Axes X: Year Y: Variable Show Data Symbols Suppress empty rows/columns Show Codes >

Submit Help

The digital global map of irrigation areas

October 2013



Area equipped for irrigation in percentage of land area

0	10 - 20
< 0.1	20 - 35
0.1 - 1	35 - 50
1 - 5	50 - 75
5 - 10	75 - 100

The map shows area equipped for irrigation in percentage of cell area. For the majority of countries the base year of statistics is in the period 2000 - 2008.

Projection: Robinson
Resolution: 5 arc-minutes

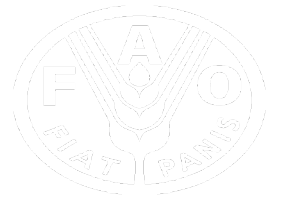
<http://www.fao.org/nr/water/aquastat/irrigationmap/index.stm>

Stefan Siebert, Verena Henrich (Institute of Crop Science and Resource Conservation, University of Bonn, Germany) and Karen Frenken, Jacob Burke (Land and Water Division, Food and Agriculture Organization of the United Nations, Rome, Italy)



universität**bonn**

AQUASTAT - global source of water statistics



- **140 Country profiles and fact sheets:** Africa, Asia, Latin America and the Caribbean
- **Regional overviews, thematic studies:** Irrigated crop calendar, wastewater
- **Maps of irrigation areas:** Global, surface and groundwater irrigation, spatial data
- **Geo-reference database on dams**
- **Institutions database**
- **Glossary**

AQUASTAT - FAO's Global Information System on Water and Agriculture

Home Overview Databases Geospatial Information Profiles Data Analysis Activities Publications

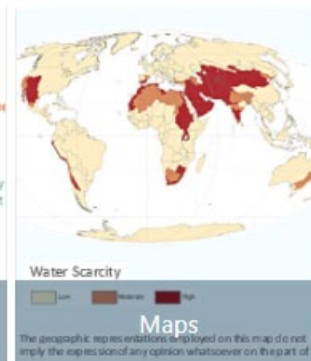
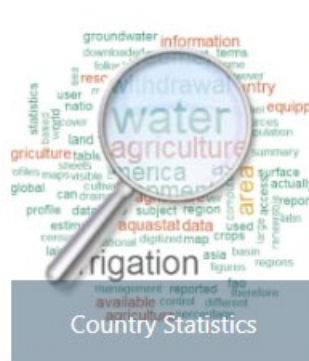


AQUASTAT is the FAO global information system on water resources and agricultural water management. It collects, analyses and provides free access to over 180 variables and indicators by country from 1960. AQUASTAT draws on national capacities and expertise with an emphasis on Africa, the Near East, countries of the former Soviet Union, Asia, and Latin America and the Caribbean. AQUASTAT plays a key role in the monitoring of the Sustainable Development Goal 6 that sets out to "ensure availability and sustainable management of water and sanitation for all", and in particular indicators of target 6.4 on water stress and water use efficiency.

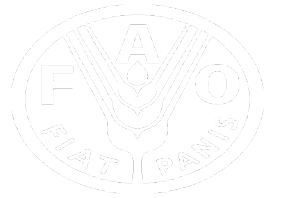
Did you know?

- **79 countries compiled the 2018 AQUASTAT questionnaire on water and agriculture.** The data collected through this questionnaire and validated are now available in the AQUASTAT core database. The 2019 questionnaire has also been sent out to over 180 countries.
- **WaPOR version 2 database and the WaPOR 1.0 quality assessment report were launched at the 2nd International seminar on Drought and Agriculture 2019.** The technical report describes the quality assessment of the FAO's data portal to monitor water productivity through open access of remotely sensed derived data. [\[Read the report\]](#).

Highlights



Revamping AQUASTAT



Challenges:

- **Irregular and uneven geographically updates**
Country profiles are updated every 5-10 years
- **Country driven SDG process**
Even if government validation was always asked, very little answer

Opportunities:

- **SDG Target 6.4 relies** to a large extent directly or indirectly on data, guidelines and methodologies developed and provided by **AQUASTAT**.
- **UN-Water Integrated Monitoring Initiative (GEMI)** expands existing monitoring efforts of SDG6

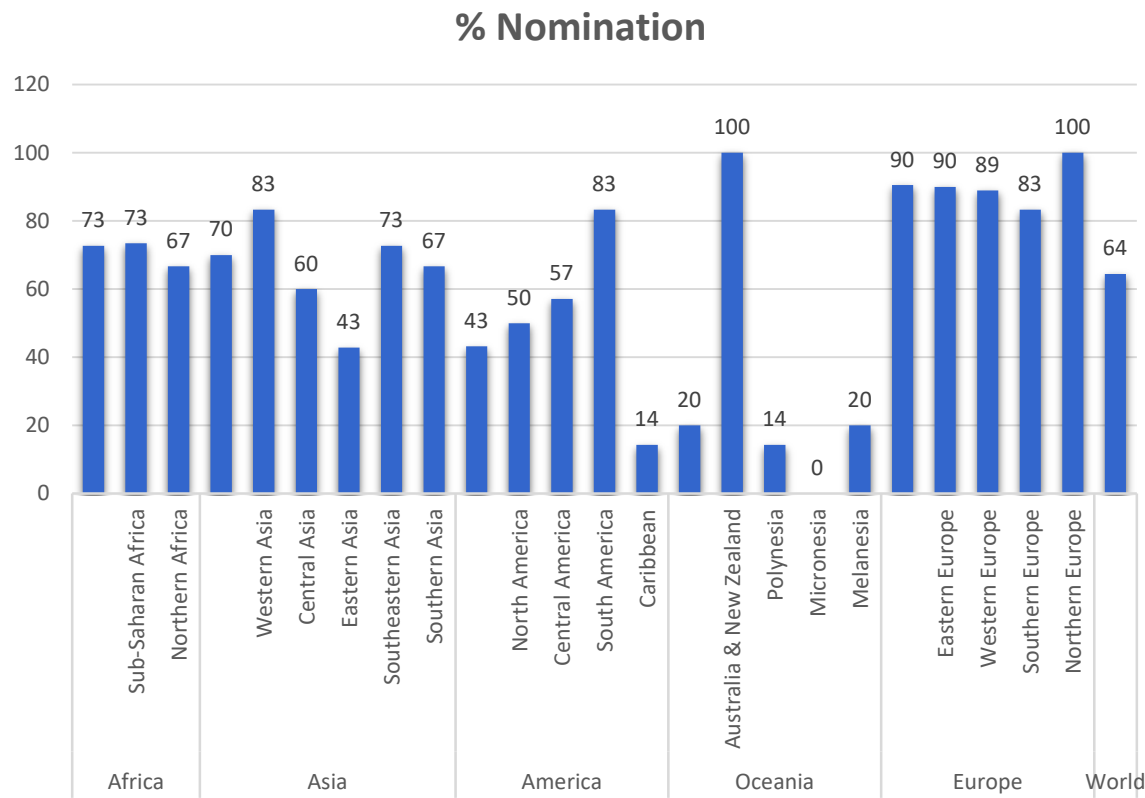
→ Regional workshops with UN-Water GEMI project

- Southern Africa (April 2019)
- Central Asia (October 2019)
- Eastern Africa (October 2019)
- Southern Asia (March 2020)
- Central America & West Africa (2020 tbd)

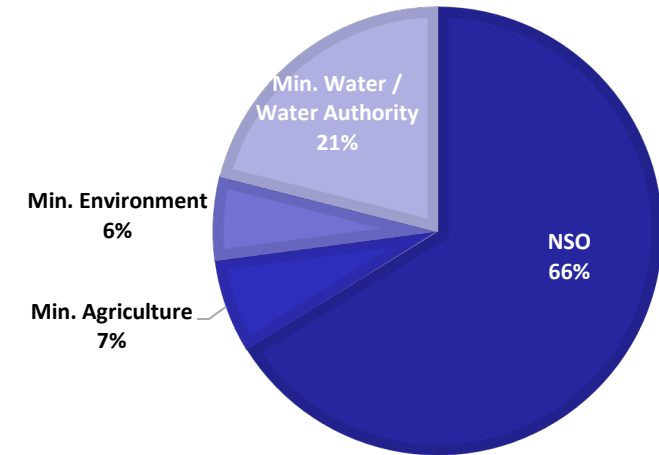
AQUASTAT National Correspondents



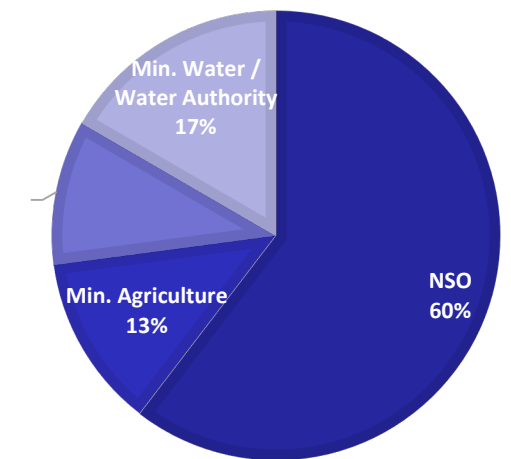
➤ 137 National Correspondents Nominated

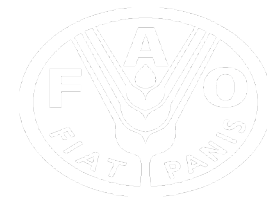


Organization of the National Correspondents



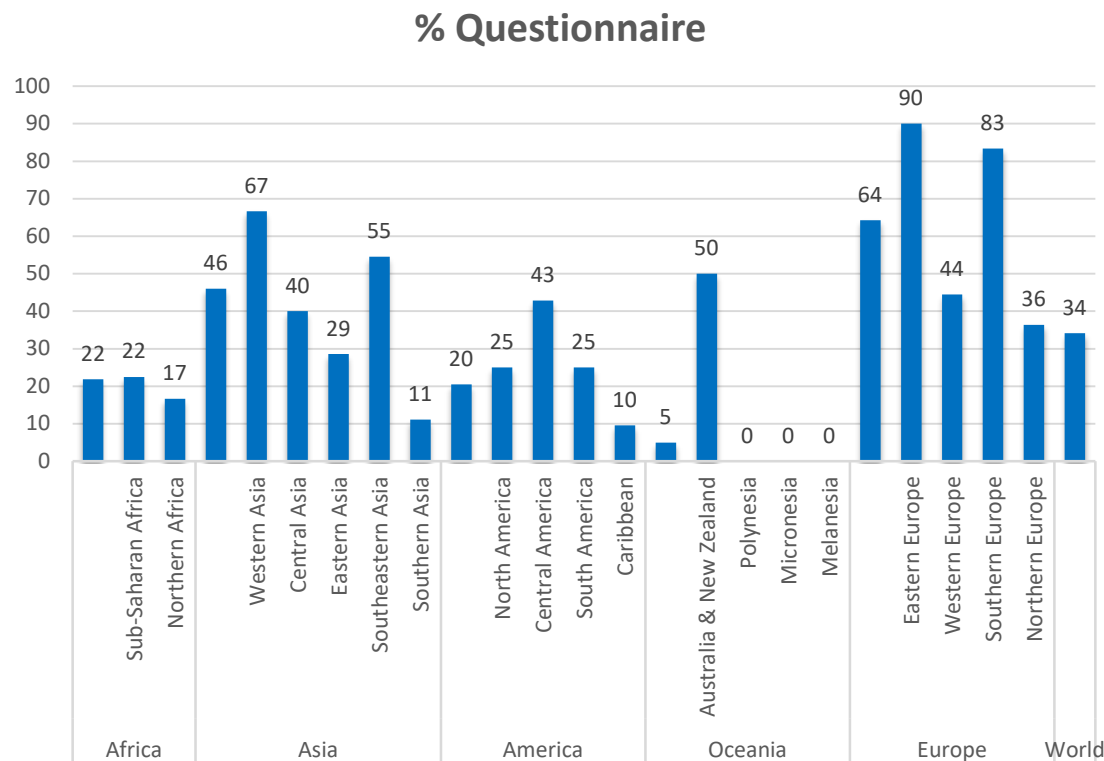
Organization of the alternates



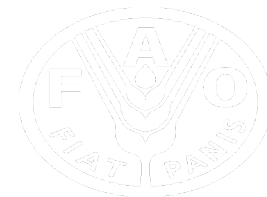


2019 AQUASTAT data collection

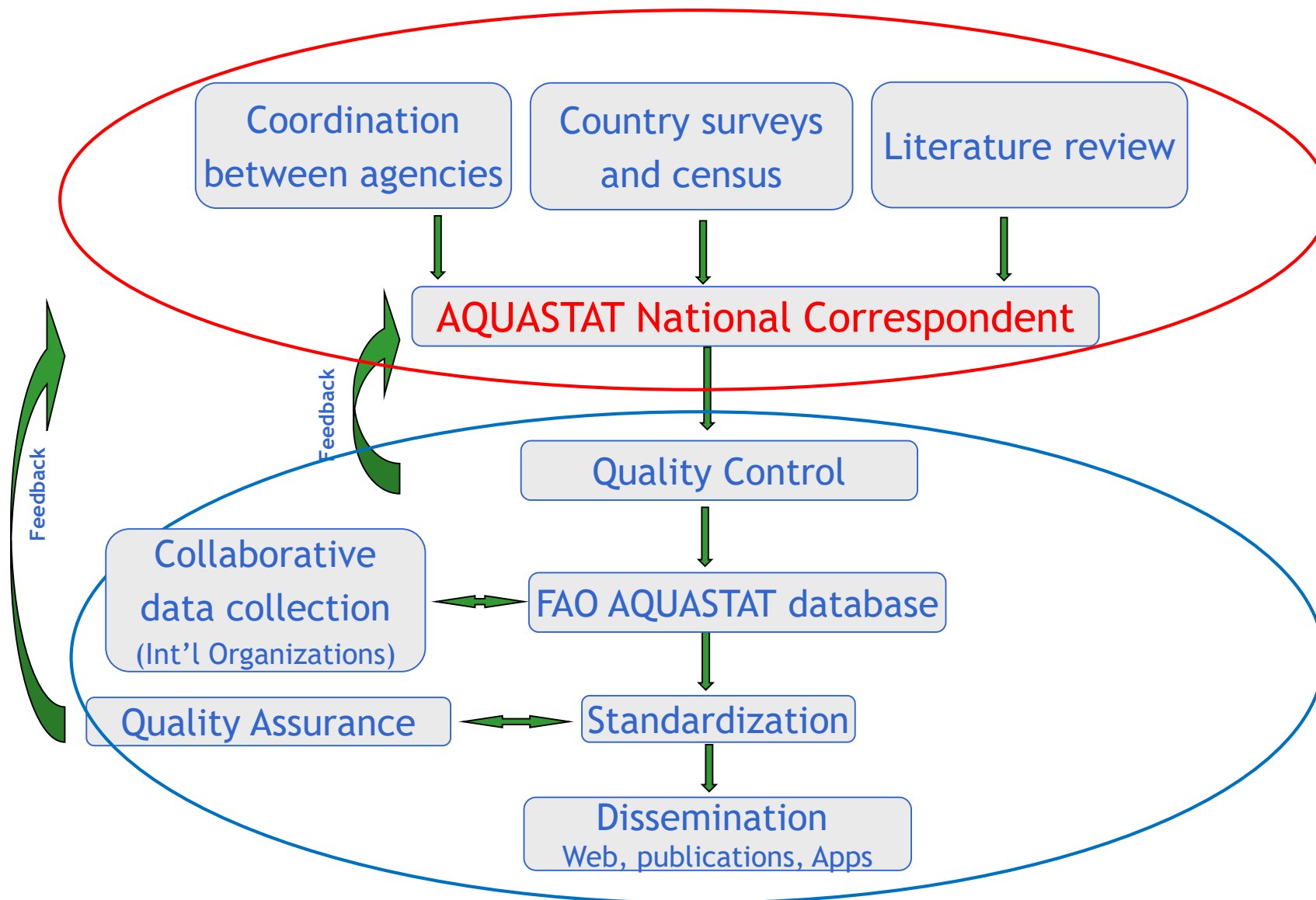
- Harmonized data collection: annual questionnaire sent to 205 countries
- 89 questionnaires received in 2019 (+ 5 additional countries indicated that they don't have new data)



- 3-5 years longer data collection



The new AQUASTAT methodology



2019 questionnaire



Water and Agriculture Questionnaire 2019
AQUASTAT Data collection on water use for agriculture and rural development

Country: GRENADA
Reference: calendar years from 2015 to 2017

Purpose of the questionnaire

Data collected through this questionnaire aim to provide a comprehensive picture of water resources and uses at the national level, and to describe its major characteristics, trends, constraints and perspectives, with particular attention to the agricultural sector. In particular, data collected are expected to:

- Allow the update the AQUASTAT database, which is the global public reference information system on water maintained by the FAO. Since 1994, AQUASTAT provides quality information on water resources and water use in each country and makes it available to the users in a standard format. It focuses on developing countries in Africa, Asia, Latin America and the Caribbean. AQUASTAT data and reports are available on at <http://www.fao.org/aquastat>.
- Monitor the water-related Sustainable Development Goals' (SDG) indicators 6.4.1 (water efficiency) and 6.4.2 (water stress), of which FAO is the custodian agency.
- Support the analyses on water in agriculture and serve as a major tool for large-scale planning and predictive studies.
- Provide policy makers with comprehensive information on the state of country water management in agriculture across the world.

Please complete or update the contact details of the national focal point responsible for this questionnaire in your country.

AQUASTAT National Correspondent

Name	
Title	
Organization	
Address	
City	
Email	
Tel	
Fax	
Web site address	

Page 1

➤ 3 languages

National data



0 Water Resources						
0.1.		Unit	2015	2016	2017	Metadata
011	Total Renewable Water Resources (Long-term average)	km ³ /yr				Click to add metadata on 011
I Water withdrawals						
I.1.	Water withdrawals by sector	Unit	2015	2016	2017	Metadata
111	Total water withdrawal (1111 + 1112 + 1113)		5			Click to add metadata on 111
1111	Agricultural water withdrawal: total (11111 + 11112 + 11113)		3.5			Click to add metadata on 1111
11111	Water withdrawal for irrigation					Click to add metadata on 11111
11112	Water withdrawal for livestock (watering and cleaning)					Click to add metadata on 11112
11113	Water withdrawal for aquaculture					Click to add metadata on 11113
1112	Municipal water withdrawal	km ³ /year	1			Click to add metadata on 1112
1113	Industrial water withdrawal (incl. water for cooling of thermoelectric plants)		0.5			Click to add metadata on 1113
11131	Water withdrawal for cooling of thermoelectric plants					Click to add metadata on 11131
112	Environmental flow requirements (stable over time)	km ³				Click to add metadata on 112
I.2.	Water withdrawals by source	Unit	2015	2016	2017	Metadata
121	Total surface water and groundwater withdrawal (freshwater) (1211 + 1212)		4.5			Click to add metadata on 121
1211	Surface water withdrawal		4			Click to add metadata on 1211
1212	Groundwater withdrawal	km ³ /year	0.5			Click to add metadata on 1212
122	Desalinated water produced					Click to add metadata on 122
123	Direct use of treated municipal wastewater		0.5			Click to add metadata on 123
124	Direct use of agricultural drainage water					Click to add metadata on 124
II Municipal wastewater						
		Unit	2015	2016	2017	Metadata
21	Produced municipal wastewater					Click to add metadata on 21
22	Collected municipal wastewater	km ³ /year				Click to add metadata on 22
23	Treated municipal wastewater					Click to add metadata on 23
III Irrigation and drainage						
		Unit	2015	2016	2017	Metadata
III.1.	Area under agricultural water management					
311	Total agricultural water managed area (3111 + 3112 + 3113)					Click to add metadata on 311
3111	Area equipped for irrigation: total (31112 + 31113 + 31114)			2800		Click to add metadata on 3111
31111	Area equipped for irrigation: part actually irrigated			2633		Click to add metadata on 31111
31112	Area equipped for full control irrigation: total (311122 + 311123 + 311124)			2800		Click to add metadata on 31112
311121	Area equipped for full control irrigation: part actually irrigated			2633		Click to add metadata on 311121
311122	Area equipped for full control irrigation: surface irrigation			1800		Click to add metadata on 311122
311123	Area equipped for full control irrigation: sprinkler irrigation	1000 ha		500		Click to add metadata on 311123
311124	Area equipped for full control irrigation: localized irrigation			500		Click to add metadata on 311124
31113	Area equipped for irrigation: equipped lowland areas			0		Click to add metadata on 31113
31114	Area equipped for irrigation: spate irrigation			0		Click to add metadata on 31114
3112	Cultivated wetlands and inland valley bottoms non-equipped					Click to add metadata on 3112
3113	Flood recession cropping area non-equipped					Click to add metadata on 3113
III.2.	Irrigated production					
321	Total harvested irrigated crop area (full control irrigation only)	1000 ha		5800		Click to add metadata on 321
III.3.	Drainage					
331	Area equipped for irrigation drained	1000 ha				Click to add metadata on 331
IV Environment						
		Unit	2015	2016	2017	Metadata
41	Area salinized by irrigation	1000 ha				Click to add metadata on 41

- 34 variables for 2015, 2016, 2017
- SDG indicators 6.4.1 (green) & 6.4.2 (yellow)
- Or used in case of missing values (light green/yellow)
- Gross Value Added (GVA) from UNSD
- Cultivated area & GDP Deflators from FAOSTAT
- Ratio between rainfed and irrigation yields estimated from FAO "Agriculture Towards 2050" study
- Disaggregation & control



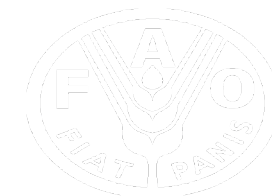
International Standard Industrial Classification of All Economic Activities (ISIC)

Revision 4

AGRICULTURE
MIMEC
SERVICES
N/A

Section	Divisions	Description
A	01–03	Agriculture, forestry and fishing
B	05–09	Mining and quarrying
C	10–33	Manufacturing
D	35	Electricity, gas, steam and air conditioning supply
E	36–39	Water supply; sewerage, waste management and remediation activities
F	41–43	Construction
G	45–47	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	49–53	Transportation and storage
I	55–56	Accommodation and food service activities
J	58–63	Information and communication
K	64–66	Financial and insurance activities
L	68	Real estate activities
M	69–75	Professional, scientific and technical activities
N	77–82	Administrative and support service activities
O	84	Public administration and defence; compulsory social security
P	85	Education
Q	86–88	Human health and social work activities
R	90–93	Arts, entertainment and recreation
S	94–96	Other service activities
T	97–98	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U	99	Activities of extraterritorial organizations and bodies

Metadata



METADATA

This section collects, for each provided data, metadata on the source, the dissemination means and specific comments.

Please complete the three types of information (data source, data dissemination and metadata) for each variable. For each type of information, please first select a category from the drop down menu in the blue cells (options listed below) and then specify any addition information/comment in the "Please specify" column beside.

Please click on "Back to data" to return to the corresponding variable in worksheet "National data".

1. Data source	2. Data dissemination	3. Metadata
1.1 Census	2.1 Database	3.1 Reference area: Geographical coverage, for example: "Excludes Island X" or "Includes only city X"
1.2 Survey	2.2 Yearbook	3.2 Reference period: Time coverage, for example: "Data actually from 2010 considered still valid"
1.3 Administrative data/records	2.3 Statistical bulletin	3.3 Comparability (geographical): Break in geographical coverage, for example: "Data excludes the newly independent region X"
1.4 Estimates (please specify methodology)	2.4 Other statistical publication	3.4 Comparability (over time): Break in time-series, for example: "Irrigation in greenhouses is included from 2005"
1.5 Unknown	2.5 Policy report	3.5 Adjustment: Change compared to the data source/dissemination, for example: "Area given in acres in source, converted in ha with the ratio acre= x' n ha"
	2.6 Academic paper	3.6 Overall accuracy: Any known quality issue regarding the data, for example: "The country's municipal water withdrawal tripled in five years"
		3.7 Components: Any further break-down/disaggregation available, for example: "Flow of border rivers is 10, consisting of 5 from river A , 3 from river B and 2 from river C"
		3.8 Observations: General contextual notes about the variable in the country, for example: "Landlocked country, no desalination possible"
		3.9 Methodology: If the method by which a value is derived is known but doesn't fit into any of the categories above

011. Total Renewable Water Resources (long-term average)		Please specify	Back to data
1. Data source:		Year, methodology	
2. Data dissemination:		Authors (year) Title, Publisher. Link if available online	
3. Metadata:		Comment 1 Comment 2 Comment 3	

111. Total water withdrawal		Please specify	Back to data
1. Data source:		Year, methodology	
2. Data dissemination:		Authors (year) Title, Publisher.	

Data source
Please select
from the drop-
down list

Metadata in the database



AQUASTAT

E - External data I - AQUASTAT estimate
 K - Aggregate data L - Modelled data
 Click for details
 Click on green cells for metadata

10-AUS. Australia

	2003-2007	2008-2012	2013-2017
4250. Agricultural water withdrawal (10 ⁹ m3/year)	12.24 (2005)	9.587 (2012)	10.59 (2015)
4252. Industrial water withdrawal (10 ⁹ m3/year)	2.332 (2005)	2.688 (2012)	2.768 (2015)
4251. Municipal water withdrawal (10 ⁹ m3/year)	4.191 (2005)	3.744 (2012)	4.015 (2015)

Australia
Municipal water withdrawal
2005

Source
Title: Water Account, Australia, 2004-05
Year: 2006
File resource: AUS2006_ABSWater2005.pdf
 more...

METADATA
Components(P): [N] Includes 2.108 (household) + 2.083 (industry- water supply)



Food and Agriculture Organization of the United Nations

AQUASTAT

E - External
 K - Aggr
 Click o

10-AUS. Australia

	2003-2007	2008-2012	2013-2017
4250. Agricultural water withdrawal (10 ⁹ m3/year)	12.24 (2005)	9.587 (2012)	10.59 (2015)
4252. Industrial water withdrawal (10 ⁹ m3/year)	2.332 (2005)	2.688 (2012)	2.768 (2015)
4251. Municipal water withdrawal (10 ⁹ m3/year)	4.191 (2005)	3.744 (2012)	4.015 (2015)

Australia
Agricultural water withdrawal
2015

Source
Title: Water Account, Australia, 2014-15
Year: 2016
Link: http://www.abs.gov.au/ausstats/abs@.nsf/mf/4610.0
File resource: AUS2016ABSWaterAccount.zip
 more...
 No metadata.



SDG 6.4.1 Calculation tool

- New in 2019: SDG computation sheets
- Automatically filled in from data compiled in “National data” worksheet

IRRIGATED AGRICULTURE WATER USE EFFICIENCY (Awe)		UNIT	CALCULATION RULES
Ratio between rainfed and irrigated yields	[1] <input type="text" value="0.461"/>	decimals	AQUASTAT data (below) used if no data is entered
<i>Proportion of irrigated land on the total arable land (Ai)</i>	[2] <input type="text" value="0.125"/>	decimals	= [3]/[4]
Irrigated land	[3] <input type="text" value="5800"/>	1000 ha	
Cultivated land	[4] <input type="text" value="46378"/>	1000 ha	
<i>Proportion of agricultural GVA produced by rainfed agriculture (Cr)</i>	[5] <input type="text" value="0.763"/>	decimals	= (1/(1+((2)/(1-(2)*(1))))))
Gross value added by agriculture (excluding river and marine fisheries and forestry)	[7] <input type="text" value="30304481325"/>	USD (2015 price)	
Volume of water used by the agricultural sector (including irrigation, livestock and aquaculture)	[6] <input type="text" value="3.500"/>	km ³	
Irrigated Agriculture Water Use Efficiency	[8] <input type="text" value="2.049"/>	USD/m ³	= ([7]*(1-[5]))/([6]*1000000000)
MIMEC WATER USE EFFICIENCY (Mwe)			
Gross value added by MIMEC sector (including energy)	[9] <input type="text" value="278000000000"/>	USD (2015 price)	
Volume of water used by the MIMEC sector (including energy)	[10] <input type="text" value="0.500"/>	km ³	
MIMEC sector Water Use Efficiency	[11] <input type="text" value="556.000"/>	USD/m ³	= [9]/([10]*1000000000)
SERVICES WATER USE EFFICIENCY (Swe)			
Gross value added by services	[12] <input type="text" value="851000000000"/>	USD (2015 price)	
Volume of water used by the services	[13] <input type="text" value="1.000"/>	km ³	
Services Water Use Efficiency	[14] <input type="text" value="851.000"/>	USD/m ³	= [12]/([13]*1000000000)
WATER USE EFFICIENCY (WUE)			
<i>Proportion of water used by the agricultural sector over the total water use</i>	[15] <input type="text" value="0.70"/>	decimals	= [6]/([6]+[10]+[13])
<i>Proportion of water used by the MIMEC sector over the total water use</i>	[16] <input type="text" value="0.10"/>	decimals	= [10]/([6]+[10]+[13])
<i>Proportion of water used by the service sector over the total water use</i>	[17] <input type="text" value="0.20"/>	decimals	= [13]/([6]+[10]+[13])
Water Use Efficiency	[18] <input type="text" value="227.23"/>	USD/m ³	= ([15]*[8]) + ([16]*[11]) + ([17]*[14])

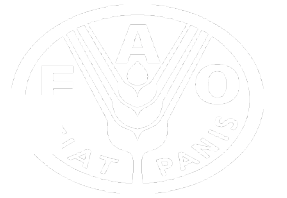
Page 1

Page 4

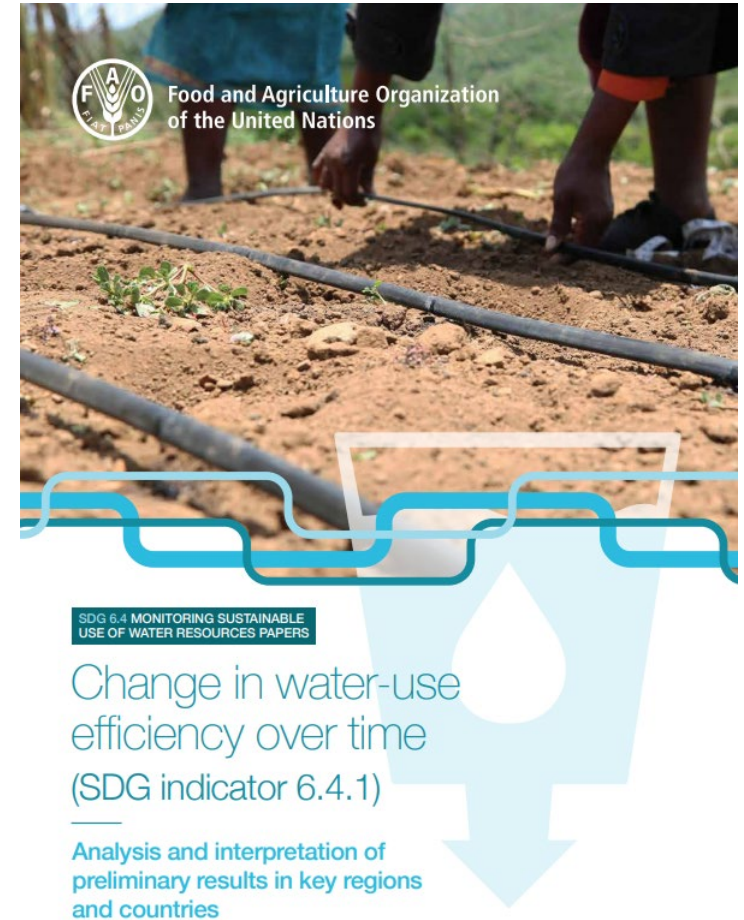
Page 2

Page 5

Economic interpretation of SDG 6.4.1



- FAO Publication launched in August 2019:
<http://www.fao.org/3/ca5400en/ca5400en.pdf>
- FAO Global baseline for SDG indicator 6.4.1:
<http://www.fao.org/3/CA1588EN/ca1588en.pdf>



SDG 6.4.2 Calculation tool



Year: 2015

WATER STRESS	UNIT	CALCULATION RULES
Total freshwater withdrawal (surface + groundwater)	[1] 4.500 in km ³	= [2]-[3]-[4]-[5] if missing from "National data"
Total water withdrawal	[2] 5.000 in km ³	OK
Desalinated water produced	[3] #N/A in km ³	
Direct use of treated municipal wastewater	[4] 0.500 in km ³	
Direct use of agricultural drainage water	[5] #N/A in km ³	
Total renewable freshwater resources	[6] 492.000 in km ³	AQUASTAT data (below) used if no data is entered
Environmental flow requirements (volume)	[7] 243.300 in km ³	FAO-IMWI data (below) used if no data is entered
Water Stress	[8] 1.809 %	= ([1]/([6]-([7]/100)))

Notes: The definitions of the variables listed in the form are available in AQUASTAT:

<http://www.fao.org/aquastat/en/databases/glossary/>

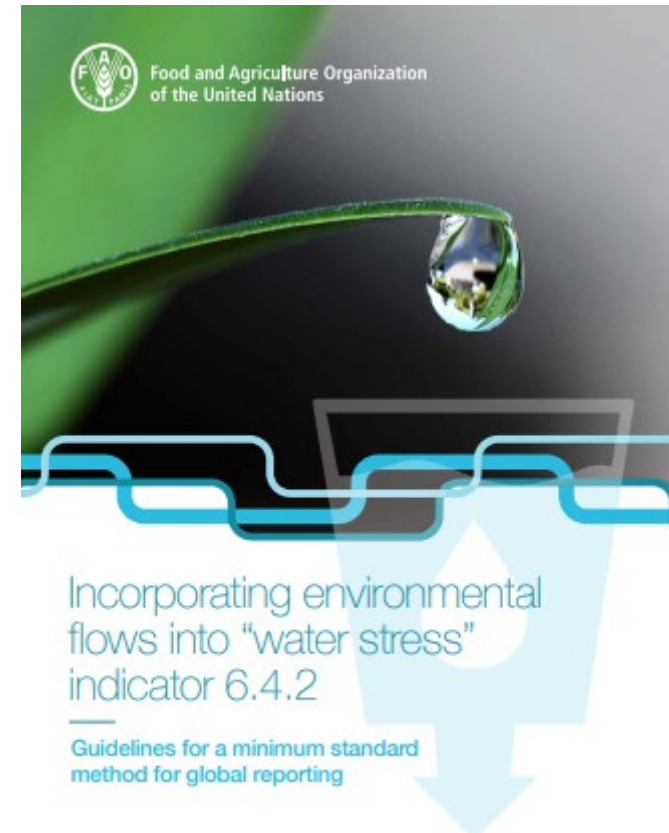
Additional data used in the computation of the SDG 6.4.2:

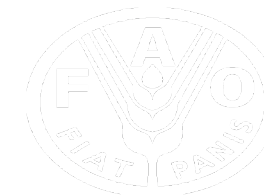
Source	Variable	Unit	2015	2016	2017
AQUASTAT	Total renewable freshwater resource	km ³ /yr			492
FAO & WMI	Environmental flow requirements (volu	km ³ /yr			243.3

Environmental Flows Requirements




- Quantities of water required to sustain freshwater and estuarine ecosystems
 - Methods of computation of EFR are extremely variable and range from global estimates to comprehensive assessments for river reaches.
 - IWMI provides national estimates at: <http://eflows.iwmi.org>
 - FAO-IWMI Publication launched in January 2019: <http://www.fao.org/3/CA3097EN/ca3097en.pdf>
- FAO Global baseline for SDG 6.4.2: <http://www.fao.org/3/CA1592EN/ca1592en.pdf>





AQUASTAT - FAO's Information System on Water and Agriculture

Background Databases Geospatial Information Countries and Basins Publications Glossary



AQUASTAT is the FAO global information system on water resources and agricultural water management. It collects, analyses and provides free access to over 180 variables and indicators for 147 countries and all FAO regional groupings, all information from 1959 to the most recent year available. AQUASTAT draws on national capacities and expertise. The core data come from extensive surveys on Africa, the Near East, countries of the former Soviet Union, Asia, and Latin America and the Caribbean. It plays a key role in the monitoring of the Sustainable Development Goal 6 that sets out to "ensure availability and sustainable management of water and sanitation for all", and in particular indicator 6.4 on water stress and water use efficiency.

Did you know?

- AQUASTAT launches the National Correspondents Network, Pilot Workshop on 26-28 June 2018 in CIHEAM-Bari, Italy.

Recently updated

Projects

- Remote sensing for water productivity
- UN-Water GEMI

See also

- Land and Water

Highlights

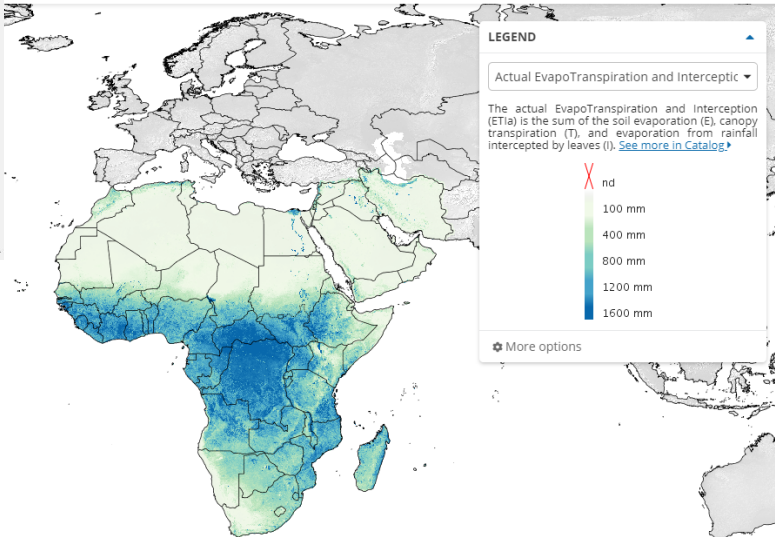
- Explore Data
- Maps
- Country Profiles

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Water Productivity

WapOR
The FAO portal to monitor Water Productivity through Open access of Remotely sensed derived data

Sign in



LEGEND

Actual EvapoTranspiration and Interception

The actual EvapoTranspiration and Interception (ETI) is the sum of the soil evaporation (E), canopy transpiration (T), and evaporation from rainfall intercepted by leaves (I). [See more in Catalog](#)

100 mm
400 mm
800 mm
1200 mm
1600 mm

More options

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Thank you!